GIOTTO WATER

Newsletter

Novembre 2020

Cellvation®
Cellulose recovery from sewage

CirTec (NL) and **Giotto Water** have signed an agreement for the distribution on the Italian market of the **Cellvation®** process by CirTec. The proposed technology consists of a process for cellulose recovery from sewage influent.

The first Cellvation® installation was realised as a part of the Horizon 2020 Innovation project **"SMART-Plant"** aiming to optimize the recovery of raw materials from sewage, increase energy efficiency and reduce greenhouse gas emissions.

SMART-Plant

Thanks to this technology **about 75% of cellulose present in sewage is recovered as a resource**. With this improvement in the environmental profile the STP's climate footprint is reduced by up to 15%.

Applying standard finescreens gives a residue that is indicated as cellulosic screenings or cellulosic sludge. This material contains a high concentration of cellulose (base of toilet paper) and seeds, fats, hairs, proteins, etc. The cellulosic sludge is therefore not a reusable product, but rather a waste. With the Cellvation® process it is possible to remove most of the contaminants and produce a cellulose called **Recell®** that is sellable.

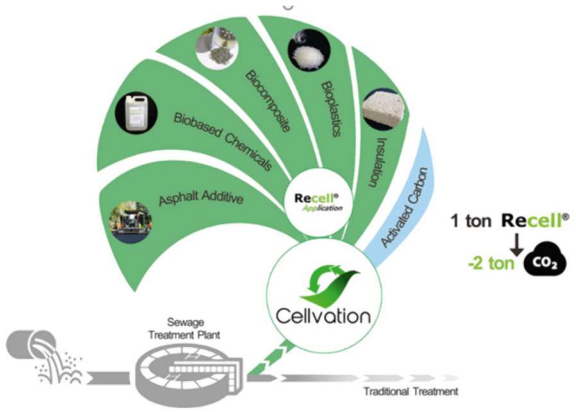
The Cellvation® technology consists of an innovative integration of dynamic fine-sieving as a primary stage of wastewater treatment and in situ post processing, to enhance the STP, while producing a marketable cellulose.

In particular, starting from raw wastewater, there are sections for sand removal, cellulose washing and technological compartments such as a rotating belt screen and a screw press. Downstream of the Cellvation® process, cellulose is recovered as a fiber, which is not further decomposed. Depending on the application where Recell® is used, further processing, drying and hygienisation are applied.

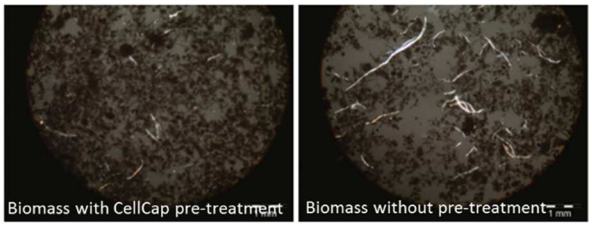
The structural fiber material can be used in the production of bio-composites. Recell® can be used also for the production of additives for the composition of **asphalt**, **bioplastic** formation and **insulating material**. At this point, the residue from the cellulose washer is digested for the production of **biogas**. However, at a representative demo scale, this residue is already converted into fatty acids, bio-oil and activated bio-carbon.

GIOTTO WATER S.r.l.
Headoffice: Via Prati Nuovi n. 23 - 27058 Voghera PV – Italy - Fiscal Code VAT 02619850189 – Ccia PAVIA: REA PV-288285
Phone. +39 0383 1918330 – Fax +39 0383 1918311 – info@giottowater.com; giottowatersrl@pec.it; www.giottowater.com

Processes are being studied to further decompose the residue into the aforementioned products. This is to make the process fully circular and to reduce the CO_2 footprint even further. **From the production of 1 ton of Recell® it is possible to reduce CO_2 emissions by over 2 tons**.



By sieving the sewage with the Cellvation® technology, besides recovering cellulose, part of the solids present in the sewage is removed together with some of the organic material measured as chemical oxygen demand (COD). This COD removal helps downstream wastewater treatment. As a result of the change in the composition of wastewater, the COD concentration in the water decreases, the relative **aeration energy is reduced**. Additionally, **the sludge growth is reduced**, since less COD is converted into biomass.



The main operational advantages of this technology, in addition to those already mentioned above, are the **reduced polymer consumption** and **reduced energy consumption for sludge dewatering**. Furthermore, since the fibers and hair are removed, the contamination of aeration elements and thus maintenance significantly decreases and since these are undissolved components, which would otherwise remain in biology as inert material, Cellvation® **increases the activity of the biomass**, without affecting the SVI and the dewaterability.